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NOTE ON RESOLUTION OF AMPHIPLEURA PELLUCIDA BY CENTRAL LIGHT.

LYMAN DECK, M. D., Salamanca, New York.

The performance of the new apochromatic objective of Zeiss, claiming N. A. 1. 63, is causing so much comment among microscopists that I thought that an account of work done with an American objective might be of interest to your readers. I have an 1–12 homo. imm. objective made by Ernst Gundlach several years ago. It is marked Ernst Gunlach 1–12 Homogenous Immersion, 140°. T. U. E. F.

This objective is almost perfectly achromatic and has a remarkably flat field, and will work through cover glass 1–100 of an inch in thickness. It will work equally well with mirror in any position, from the axis to full 70°, with hemispherical lens in place, even resolving balsam *Amphipleura pellucida* with light so oblique that only one-fourth of the field is illuminated. Attaching this objective to a B. & L. universal stand with one-inch ocular and using light from a white cloud near the sun, admitted into a darkened room through a small aperture in the shutter and striking the center of the concave mirror, which was also carefully centered and reflected through the ⅛-inch aperture in the diaphragm, which was also carefully centered, using such a light I have repeatedly resolved the lines on difficult balsam-mounted *Amphipleura pellucida* as sharply and distinctly as an ordinary student 1–5 of 110° will show the beads on dry *Angulatum*. I have also seen on an 18-band Fasoldt test plate ruled from 5,000 to 120,000 lines to the inch; the 17th band, 110,000 lines to the inch, with light from an ordinary hand-lamp direct from the concave mirror. With sunlight I have seen the 120,000 band sharp and distinct. This is as fine a ruling as I have had an opportunity of examining. I cannot see the propriety of comparing the results attained by using slides of balsam *Am. pellucida* with slides of *Am. pellucida* mounted in a medium of high refractive index, as they are so much easier to resolve than balsam mounts. I have a slide of *Am. pellucida* mounted in a medium of high refractive index that is easier to resolve than *Frustulia saxonica* in balsam. With my 1–12 it is an amusingly easy feat to resolve the lines of *pellucida* on this slide with ordinary daylight direct from the concave mirror in central position. In fact, this slide is so easy to resolve that I have seen the lines on *pellucida* on it with my B. &. L. dry 1–5 of 130° professional series.

NOTE.—Dr. Deck exhibited at Detroit a slide of *Amphipleura pellucida* mounted by Miss M. A. Booth, Longmeadow, Mass., and said by her to be in balsam. The showing was made by the use of an ordinary small coal-oil lamp with flat wick placed about one foot to the left of mirror. The latter was used with plane side up, centrally placed, and a low-power objective inserted as a condenser. With this extemporized equipment the transverse lines on several specimens of the *Amphipleura* were seen by the Doctor himself and by the undersigned, though a half dozen others who looked failed to see them. Subsequently, during the same evening, Governor Cox also pronounced the diatom thus resolved.

Through the kindness of Dr. Deck, the writer took with him to his home the slide used in these trials. By means of photography the number of transverse lines on three shells were found to range from 94,000 to 95,000 to the inch. That from which the best negative was made had 94,200. Compared with the same diatom on a Möller's balsam-mounted test plate, the latter was found to be as easy to resolve as any observed on this slide of Dr. Deck's; but after earnest and repeated efforts no glimmer of resolution could be obtained by any possible device by central light from lamp. No. 19 on Möller's plate did come out, however, better than reported at the Detroit meeting with Zeiss' apochromatic 2 mm.

T. J. BURRILL.